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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/769,388	01/30/2004	Colyn S. Case	19680-007200US	944I

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EXAMINER

RUTZ, JARED IAN

ART UNIT	PAPER NUMBER
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2187

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/769,388	Applicant(s) CASE ET AL.	
	Examiner Jared I. Rutz	Art Unit 2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 and 25-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2 and 22 is/are rejected.
- 7) ☒ Claim(s) 1, 3-21, 23 and 25-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>2/27/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-23 and 25-27, as amended on 2/27/2007, are pending in the instant application. Applicant's arguments submitted 2/27/2007, see the second paragraph of page 10 through the fifth paragraph of page 11, have been carefully and fully considered, and are persuasive.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. **Claims 2 and 22** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 26 of copending Application No. 10/769,357 in view of Kikuta et al. (US 6,260,131) as shown below.

This is a provisional obviousness-type double patenting rejection.

Instant application	10/769,357
<p>1. A translation lookaside buffer system for translating virtual addresses to physical addresses, the system comprising:</p> <p>an input arbitration module configured to receive translation requests from a plurality of clients, each translation request including a target virtual address, the input arbitration module further configured to select one of the translation requests for processing</p> <p>A primary cluster store having a plurality of locations, each location configured to store a cluster,</p> <p>wherein each cluster provides a mapping to a respective physical address for each virtual address in a range of virtual address space,</p> <p>wherein the respective ranges of different ones of the clusters have different sizes</p> <p>And wherein each cluster includes a plurality of references to blocks of physical addresses such that the virtual addresses in the range mapped by the cluster are mapped to the blocks of physical addresses</p> <p>A primary lookup logic circuit coupled to receive the selected translation request from the input arbitration module</p>	<p>1. An address translation cache for translating virtual addresses to physical addresses, the address translation cache comprising</p> <p>A local cluster store configured to store a plurality of clusters,</p> <p>wherein each cluster provides a mapping to physical addresses for a range of virtual addresses,</p> <p>the respective ranges mapped by different ones of the clusters having different sizes</p> <p>Wherein each cluster includes a plurality of references to blocks of physical addresses such that the virtual addresses in the range mapped by the cluster are mapped to the blocks of physical addresses</p> <p>A lookup logic circuit coupled to the tag store and the local cluster store,</p>

Art Unit: 2187

<p>and configured to associate one of the locations in the primary cluster store with the selected translation request, thereby designating the associated location for storing a target cluster whose range includes the target virtual address</p> <p>And a translation module configured to translate the target virtual address of the selected translation request to a physical address based at least in part on the mapping provided by the cluster stored in the primary cluster store location associated with the selected translation request</p> <p>2. A primary tag store coupled to the primary lookup logic circuit and configured to store a tag corresponding to each location in the primary cluster store, wherein each tag encodes the range of the virtual address space mapped by the cluster in the corresponding primary cluster store location</p> <p>wherein the primary lookup logic circuit is further configured to detect a primary cache hit in the event that the target virtual address of the selected translation request matches one of the tags in the primary tag store and to detect a primary cache miss otherwise.</p>	<p>the lookup logic circuit being configured to signal a cache hit in the event that a target virtual address is within the range of virtual addresses encoded by a matching one of the tag in the tag store and to signal a cache miss otherwise</p> <p>A tag store configured to store a tag corresponding to each of the clusters in the local cluster store, wherein each tag encodes the range of virtual addresses mapped by the corresponding cluster</p> <p>the lookup logic circuit being configured to signal a cache hit in the event that a target virtual address is within the range of virtual addresses encoded by a matching one of the tag in the tag store and to signal a cache miss otherwise (<i>the examiner notes that is a cache hit is signaled, it is inherently detected</i>)</p>
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4. Application 10/769,357 does not recite the claimed input arbitration module or the claimed translation module.

5. Kikuta teaches a MMU that performs input arbitration, column 9 lines 28-33, and translates a virtual address to a physical address.
6. Application 10/769,357, Kikuta, and the instant application are analogous art because they are from the same field of endeavor, virtual to physical address translation.
7. It would be obvious to one of ordinary skill in the art to use the cluster based address translation system of application 10/769,357 in place of the TLB entries of Kikuta.
8. The motivation for doing so would have been to utilize the more flexible virtual to physical address translation provided by clusters having multiple references to blocks of physical addresses.
9. Accordingly, the invention recited in claim 2 of the instant application is an obvious variation of the invention recited in claim 1 of application 10/769,357.
10. Similarly, the invention recited in claim 22 of the instant application is an obvious variation of the invention recited in claim 26 of application 10/769,357.

Allowable Subject Matter

11. **Claims 1-23 and 25-27** are allowable over the prior art of record, pending the resolution of the double patenting rejection presented supra.
12. **Claim 1** has been amended to recite the limitation "*wherein the respective ranges of different ones of the clusters have different sizes, and wherein each cluster includes a plurality of references to blocks of physical addresses such that the virtual*

Art Unit: 2187

addresses in the range mapped by the cluster are mapped to the blocks of physical addresses". This limitation is taught by the specification at least at paragraph 0064, and is argued by the Applicant in the remarks filed 2/27/2007 in the second paragraph beginning on page 10. This limitation, in combination with the other recited limitations of claim 1, is not taught or suggested by the prior art of record.

13. **Claims 2-21** depend from claim 1, and would considered allowable for at least the same reasons as claim 1.

14. **Claim 22** has been amended to recite the limitation "*wherein respective sizes of the ranges mapped by different ones of the clusters are different, and wherein each cluster includes a plurality of references to blocks of physical addresses such that the virtual addresses in the range mapped by the cluster are mapped to the blocks of physical addresses*". This limitation is taught by the specification at least at paragraph 0064, and is argued by the Applicant in the remarks filed 2/27/2007 in the second paragraph beginning on page 10. This limitation, in combination with the other recited limitations of claim 1, is not taught or suggested by the prior art of record.

15. **Claims 23 and 25-27** depend from claim 22, and would considered allowable for at least the same reasons as claim 22.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared I. Rutz whose telephone number is (571) 272-5535. The examiner can normally be reached on M-F 8:00 AM - 4:00 PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jared I Rutz
Examiner
Art Unit 2187

jir

JS


Brian R. Peugh
Primary Examiner
5/14/07